

NISTTech

DEFERRED-MULTIPLICATION SINGLE-PHOTON AVALANCHE DIODE DETECTION SYSTEM

Docket No.14-003

Abstract

<p>We have demonstrated a means to increase the detection duty-cycle of an actively gated single-photon avalanche diode, allowing the device to detect the absorption of a single-photon over a period of time that is significantly longer than the duration of the active gate that enables the detector. We achieve this by voltage biasing the device far below its breakdown voltage during the time between the short (<500 ps) active gates, causing photo-generated charge carriers to linger within the device until the active gate is applied, raising the voltage bias and sweeping the photo-generated carriers into the multiplication region, resulting in avalanche multiplication to a detectable signal level. This performance can be enhanced by techniques that bring the breakdown voltage and the punch-through voltages closer together, in our case, by lowering the temperature of the device.</p>

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Status of Availability

This invention is available for licensing exclusively or non-exclusively in any field of use.

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